

A Comparison of Quality of Life Measures in Husbands of Women with Breast Cancer: A  
Descriptive Comparison between the MOS-SF-36 and the Quality of Well-Being Scale – Self-  
Assessment

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### Abstract

The Quality of Well-Being Scale (QWB-SA) and Medical Outcome Study SF-36 short form (SF-36) are popular health-related quality of life (HRQOL) assessment tools; however, it is unclear whether these measures overlap enough to be interchangeable, and if not, which might be a better choice. This study examined conceptual overlap, validity, and relation with psychosocial functioning of the QWB-SA and SF-36 in a sample of partners of women undergoing adjuvant treatment for breast cancer. Partners ( $n = 79$ ) of breast cancer patients, recruited in a chemotherapy infusion clinic, completed the QWB-SA and SF-36 and additional psychosocial measures. Descriptive content review shows that both instruments provide a breadth of HRQOL coverage including physical health, mental health, social functioning, role functioning and general health perceptions; however, more QWB-SA scales suffered floor effects. Subscales correlated, with the strongest correlations between the QWB-SA total score and the mental health scales of the SF-36. The QWB-SA and the SF-36 Mental Health Component Summary score, but not the SF-36 Physical Component Summary score were strongly correlated to measures of mood, satisfaction with life, burden, and social support. The QWB-SA and SF-36 measure distinct aspects of HRQOL. Each instrument presents distinct advantages and disadvantages in coverage of particular domains. Labels assigned to SF-36 scales more accurately reflect what they measure. The SF-36 appeared more sensitive to the impact that psychological health played on overall assessment of HRQOL in these partners.

**Keywords:** quality of life; SF-36; QWB-SA; breast cancer; partners

## **Background**

Health-related quality of life (HRQOL) is a subjective assessment of health in terms of general health perceptions and physical, mental and social functioning (Ware 1987; Office of Disease Prevention and Health Promotion 2015). HRQOL extends consideration of health beyond morbidity to include the impact that health has on role functioning and subjective well-being. A variety of instruments exist to measure HRQOL and choosing an instrument can be confusing. Some HRQOL instruments assess general health, while others are disease specific. Two additional distinctions among instruments include health profiles and utility/preference based instruments (Haywood et al. 2005). Utility instruments weigh different dimensions of health to provide a single expression of health status, whereas, profile instruments contain separate measures of many different dimensions of HRQOL, characterizing individuals according to a profile of health components (Coons et al. 2000). The selection of a utility versus profile instrument begs the question of whether and how these different instruments may influence measurement properties, results and conclusions (Haywood et al. 2005); therefore, the present study investigated the similarities and differences in both content and conclusions drawn from a study which administered both instrument types in a caregiving population.

Clinicians and researchers are increasingly acknowledging the systematic impact of disease upon relatives and friends of patients. Partners of breast cancer patients are at increased risk for declines in HRQOL, as they act as the most frequent providers of informal caregiving (Petrie et al. 2001), provide primary support (Wagner et al. 2011), and must themselves cope with the uncertainty of the disease and their powerlessness to change the patients' situations (Bigatti et al. 2011; Bigatti et al. 2012). Our own research, using a profile measure of HRQOL, revealed that partners of breast cancer patients reported lower HRQOL compared to partners of

healthy women in terms of vitality, general health, and mental health (Wagner et al 2006); however, one might question how much this depiction of partners is influenced by our choice of HRQOL instrument.

The choice of a specific HRQOL instrument may have important implications for results and conclusions; however, few studies explicitly describe their choice for one assessment over another and it is unclear to what extent different approaches overlap (Frosch et al. 2001). The present study afforded the opportunity to examine the conceptual overlap and differences among these two types of instruments through comparison of HRQOL on the Quality of Well-Being Scale – Self-Administered (QWB-SA), a health utility index, and the SF-36, a profile measure of HRQOL.

### **Review of studies comparing the QWB and SF-36**

A small number of older studies have assessed HRQOL with both the QWB and the SF-36 in various populations, although none in a healthy, but stressed, caregiving population like ours, and none conducted more recently. Researchers have correlated scores on the QWB and SF-36 in large community based samples (Fryback et al. 1997), samples of older adults (Andresen et al. 1998), samples of HIV-positive men (Hughes et al. 1997), and prostate cancer patients (Frosch et al. 2001). The interview version of the QWB was administered in some studies (Fryback et al. 1997; Hughes et al. 1997) while the QWB-SA was still under development.

These studies report moderate correlations between components of the QWB and SF-36, with correlations strongest for physical health components and weakest for mental health components. In each study, the highest correlation was between the QWB and the physical functioning subscale of the SF-36, ranging from  $r = .51$  (Andresen et al. 1998) to  $r = .69$

(Fryback et al. 1997). The lowest correlations were found between the QWB and the role-emotional subscale of the SF-36, with each study reporting correlations of less than 0.2 (Andresen et al. 1998; Frosch et al. 2001; Fryback et al. 1997; Hughes et al. 1997). The consistent findings of these studies across diverse populations suggest that these two instruments may tap much of the same variation in physical health status.

The present study attempts to replicate and extend these findings to a new population. Rather than an ill population or community sample, this study compares the performance of the QWB-SA and SF-36 among a normal, but stressed, caregiving sample. Furthermore, this study examines the content validity of each instrument to evaluate how well each scale covers the range of content subsumed under HRQOL, including its health dimensions and representation of positive states as recommended by Ware (1987). Finally, relationships to various psychosocial outcomes known to be negatively impacted among partners of breast cancer patients including social support, burden, satisfaction with life, mood states, and stress (Bigatti et al. 2011; Blanchard et al. 1997; Wagner et al. 2006) are also examined to determine which measure is more sensitive to distress associated with marriage to a spouse suffering a life-threatening illness.

## **Methods**

This study was approved by the Indiana University Institutional Review Board to assure ethical treatment of participants. All participants provided informed consent prior to participation.

### **Participants**

Eighty partners married to or in a stable, live-in relationship with women with breast cancer were recruited as part of a larger study. One participant, who failed to complete the SF-36 was excluded, leaving a total sample of seventy-nine. Partners in this sample reported a mean

age of 51 years,  $SD = 12.49$ , and were married an average of 21.65 years,  $SD = 14.12$ . This sample consisted of 74 Caucasian (93.7%), 2 African American (2.5%) and 1 each Asian, Hispanic, and Native American (1.3%) participants. Most participants (64.8%) were employed full-time, and a significant proportion of participants (41.6%) earned a household income over \$70,000. On average, participants completed a college education or beyond. Partners rated their health with a mean score of 76.25 ( $SD = 17.82$ ) on a 0 (*least desirable health state imagined*) – 100 (*perfect health*) scale on the QWB-SA.

Partners were also asked to provide time since the diagnosis and stage, if they knew it. Patients were on average 35 months post diagnosis with a median of 14 months post diagnosis. Stage of cancer was well distributed with 19% reported in stage I, 32.9% in stage II, 20.3% in stage III, 17.7% stage IV, and 10% unknown. Because patients were recruited at an infusion clinic, most (93.7%) partners reported that the patients had undergone chemotherapy with 2.4% reporting they had not started treatment yet.

## **Procedure**

Participants were recruited from the waiting room of a chemotherapy infusion clinic as they accompanied the breast cancer patient, according to institutional ethical standards. Participant recruitment was conducted through convenience sampling and eligibility criteria specified that men must a) be at least 21 years of age, b) speak English fluently, c) be able to read and write, and d) married or in a stable romantic relationship to a woman receiving treatment for breast cancer at the infusion clinic. Consenting partners were provided surveys by the first author or another trained, graduate-level research assistant. Partners completed surveys at home and returned them via mail. Once surveys were mailed back to the research lab, trained

research assistants reviewed surveys for completeness and called participants within a week to fill in missing data. All participants received \$30 gift certificates following participation.

## Measures

### *Project Questionnaire*

Partners reported their demographic characteristics (race, employment, income, education level, years married, etc.) and the patients' cancer characteristics (cancer stage, treatments, time since diagnosis).

### *Quality of Well-Being Scale-SA* (Andresen et al. 1998)

This instrument combines preference-weighted measures of symptoms and functioning to provide a numerical point-in-time expression of well-being, which ranges from 0 for death to 1.0 for asymptomatic optimum functioning; therefore, a higher score indicates better health. This single, utility score is referred to as the QWB score subsequently in this paper. The QWB-SA also has four subscales which permits additional use as a profile measure. The *acute and chronic symptoms* subscale lists a series of physical and emotional symptoms of illness and asks participants to indicate whether they have experienced these symptoms over the past 3 days. The *mobility* subscale assesses restrictions with transportation as a result of poor health. The *physical activity* subscale asks respondents to indicate whether they have been bothered by a series of physical limitations, such as trouble walking/climbing stairs or using a cane or walker. Finally, the *usual activity* subscale asks participants whether they have avoided or needed help with self-care activities, shopping, or social activities over the past day due to physical or emotional health. For each of these subscales, the participant is assigned decimal points for endorsing symptoms or limitations, resulting in higher scores representing worse health (more symptoms and limitations). Subscale scores are subtracted from 1, resulting in a total QWB score with

higher scores representing better HRQOL. Reliability for the QWB-SA has been demonstrated (Cronbach's  $\alpha > .90$ ) (Kaplan et al. 1976; Anderson et al. 1989), and its validity as an outcome measure has been shown for various medical conditions (Kaplan et al. 1976; Kaplan et al. 1984). Reliability for the present sample was  $\alpha = .86$ .

***Medical Outcomes Study SF-36*** (Ware & Sherbourne, 1992)

This multi-dimensional, self-administered questionnaire consists of 36 items measuring physical and mental health concepts. Instead of creating a single score, the SF-36 produces a profile of HRQOL divided into eight different subscales: general health perceptions, physical functioning, role limitations due to physical problems, bodily pain, general mental health, vitality, role limitations due to mental health problems, and social functioning. The instrument may also be divided into *Physical Component Summary* (PCS) and *Mental Health Component Summary* (MCS) scores. Scores are norm-based and range from 0 to 100 for each subscale, with higher scores indicating better health status; a score of 50 indicates an average score in the American population. The psychometric properties of the SF-36 have been tested extensively in the general population and many chronically ill populations, and consistently demonstrated good reliability and validity (Ware and Gandek 1998). For the present study, the subscales showed good to strong internal consistency reliability, with coefficient alpha scores ranging from .70 (social functioning) to 0.89 (physical functioning).

***Satisfaction with Life Scale (SWLS)***

This 5-item instrument measures quality of life from the point of view of the individual. For items such as "I am satisfied with my life" respondents mark on a 7-item Likert-type scale (1 = *strongly disagree* to 7 = *strongly agree*). Internal consistency was reported by the authors at  $\alpha$



= .87, test-retest reliability at  $\alpha = .82$ , and concurrent validity as appropriate (Deiner et al. 1985).

Reliability in the present study was  $\alpha = .88$ .

### ***Profile of Mood States (POMS) - Short Form***

This 30-adjective instrument measures various “affective states” leading to calculation of a total mood disturbance score. Participants endorse their experience of various mood states over the *past* week on a 5-point scale ranging from 0 (*not at all*) to 4 (*extremely*). The POMS has good concurrent validity and low to moderate correlations with measures of social desirability (McNair et al. 1992). Reliability for total mood disturbance in the present sample was  $\alpha = .91$ .

### ***Subjective Stress Scale***

This 4-item scale was developed for the Los Angeles Heart Study (Chapman et al. 1966). For items such as “In general, I am usually tense or nervous” respondents mark on a 4-item Likert-type scale (This describes me: 1 = *not at all* to 7 = *very well*). Items in this scale correlate with social stress ( $r = .32$ ) and neuroticism ( $r = .42$ ) (Schär et al. 1973). Stress scores demonstrate relative stability over time (Croog and Fitzgerald 1978). Reliability for the present study was  $\alpha = .83$ .

### ***Depression***

The 20-item, self-report Center for Epidemiologic Studies Depression Scale (CES-D) is extensively used in the health literature to measure depressive symptoms (Radloff 1977). For items such as “I talked less than usual” respondents mark on a 4-item Likert-type scale (0 = *rarely or none of the time* to 3 = *most or all of the time*) during the past seven days. The scale distinguishes between various levels of problem severity. Reliability has been reported at  $\alpha = .88$  (Radloff 1977) and was  $\alpha = .89$  in the present study.

### ***Activities of Daily Living***

The Illness Impact Form (Sexton 1984) measures how much the patient depends on the spouse for activities of daily living (ADLs). Partners are asked to rate how much the patient depends on them to perform tasks (such as bathing, dressing, transportation) on a 4-point scale ranging from 0 = *never* to 3 = *always*. The measure was adapted for use with the specific population in the present study, asking partners specifically about needs of the patient *because of the breast cancer or its treatment*. Reliability has been estimated with a sample of partners of fibromyalgia patients and found to be  $\alpha = .83$  (Bigatti and Cronan 2002). Reliability in the present sample was  $\alpha = 0.81$ .

### ***Social Support***

The Interpersonal Support Evaluation List (ISEL) is a true/false scale specifically designed to assess the "role social supports play in protecting people from the pathogenic effects of stress" (p. 74) (Cohen et al. 1985). Higher scores indicate stronger social support. Validity was tested with other social support measures ( $r = .46$  to  $r = .62$ ), self-esteem measures ( $r = .74$ ), and self-disclosure measures ( $r = .40$ ). Six-month test-retest reliability was good ( $\alpha = .74$ ). Reliability ranges from  $\alpha = .77$  to  $\alpha = .86$  (Cohen et al. 1985). Reliability for the present study was  $\alpha = .90$ . This measure has been employed successfully in other cancer-partner studies (Lien et al. 2009; Tomarken et al. 2008).

### **Statistical plan**

Content validity of each scale was assessed descriptively through an item by item examination of each scale. Data were also analyzed using Cronbach's alpha and correlational analyses. Cronbach's alphas were calculated to assess reliability, as reported above. Product-moment correlations were computed to examine the relationship between subscales of the QWB-SA and SF-36 as well as the relationship of these scales to psychosocial measures to test validity.

## Results

### Preliminary analyses

Before conducting statistical analyses, surveys were reviewed for completeness and data were cleaned. Missing data were handled in accordance with the guidelines of the scoring manuals for each survey. See Table 1 for descriptive statistics of each measure. A floor effect was observed for the mobility scale of the QWB-SA; therefore, it was not included in subsequent analyses.

### Content validity

Ware (1987) identifies five dimensions as essential to cover the breadth of HRQOL which include physical health, mental health, social functioning, role functioning and general health perceptions. Table 2 provides a comparison of the content of the QWB-SA and SF-36, organized by these health dimensions recommended by Ware (1987) as one standard to judge generic HRQOL measures. Review of scale items reveals that each health dimension receives adequate attention; however, one measure can present advantages over the other in a particular dimension. For example, in the *physical functioning* dimension, both measures assess physical limitations and abilities; however, only the QWB-SA assesses days spent in bed or at a nursing facility. Conversely, only the SF-36 assesses physical well-being in terms of positive states such as vitality and energy. Noticeable differences also exist in the assessment of mental health, with the QWB-SA exploring a wider range of psychological symptoms than the SF-36, by assessing psychotic thinking, substance use and eating changes. However, the SF-36 presents a wider range of measurement than the QWB-SA by including a focus on positive emotional states such as happiness and peacefulness. Assessment of general health perceptions is nearly identical between the two measures, but the SF-36 might afford a slight advantage again in increased

range of assessment by asking the participant to rate the extent to which they feel their health is *excellent*. In role-functioning, both measures show strength in assessing interference of usual activities due to both physical and emotional problems.

Content validity may also be considered in terms of how well summary scale labels reflect the items used to measure them. The descriptive labels assigned to the SF-36 scales may cause less confusion than the labels assigned to the QWB-SA scales, as the division of the QWB-SA into fewer scales requires that multiple HRQOL dimensions fall under one label. For example, the *usual activity* scale of the QWB-SA contains items assessing time spent in a nursing home, assistance with activities of daily living, limitations in work and housekeeping, and limitations in social activities. The *usual activity* scale therefore assesses two of Ware's (1987) dimensions; physical role limitations and social functioning. The devotion of separate subscales to each of these dimensions by the SF-36 may make the definition of the subscales more obvious, and less confusing, to the reader.

### **Correlations between QWB-SA and SF-36**

A series of bivariate correlations were conducted between the scales of the QWB-SA and SF-36. As Table 3 shows, many correlations were significant ( $p < .05$ ), generally small to moderate in strength, and in predicted directions. Noteworthy is the lack of predicted, significant correlations between the QWB score and SF-36 *physical functioning* which contradicts previous research studies in different populations (Kaplan et al. 1998). PCS had only one significant correlation to the QWB in the *physical activity* subscale ( $r(77) = -0.34, p < .01$ ). Unlike previous studies which report the weakest relationships between the QWB and SF-36 *role emotion* subscale (Haywood et al. 2005), our study yielded this as the strongest and significant correlation.

**Correlates of HRQOL measures to psychosocial outcomes**

A series of bivariate correlation analyses were conducted to compare the relationship of psychosocial distress among partners to the QWB score and SF-36 MCS and PCS. Psychosocial outcomes correlated with the QWB-SA score and MCS of the SF-36, but did not correlate with PCS. The MCS demonstrated the most consistent pattern and was significantly correlated to each psychosocial outcome. See Table 4 for correlation coefficients.

**Discussion**

The purpose of the present study was to examine two HRQOL measures and to determine their conceptual overlap and how well each related to measures of psychosocial functioning among partners of women undergoing treatment for breast cancer. Such comparisons have been conducted in the past either reviewing articles that utilize just use one instruments (Busija et al. 2001; Haywood et al. 2005; Shearer and Morshed 2011) or directly comparing the QWB and the MOS SF-36 (Frosch et al. 2001; Fryback et al. 1997; Hughes et al. 1997). This is the first direct comparison of the QWB-SA to the SF-36 in a single study of a caregiving population.

One unique contribution of this study is a more thorough examination of content validity than previous studies. Effective communication about health requires correspondence between health concepts and operational definitions, and surveys vary in their content coverage of HRQOL, a multi-dimensional construct. Instruments also vary in how consistently they label subscales with the actual content they contain. This study assessed the strengths of the SF-36 and QWB-SA according to two attributes outlined by Ware (1987) to evaluate content validity of health. The first attribute requires that surveys represent the full range of health dimensions, for which both the SF-36 and QWB-SA most certainly do, yet comparisons of instrument's scales reveal differences in their depth of assessment of each dimension. The SF-36 may bestow an

advantage over the QWB-SA in terms of the face validity of its subscales, as the labels assigned to each of the eight subscales more adequately summarize the content of the subscale items and map well onto Ware's five dimensions of health. Content of the QWB-SA subscales is not as obvious by examining their labels and some of the health dimensions can be found across multiple QWB subscales. These differences in face validity may make it easier for a lay person or practitioner to interpret the meaning of scales on the SF-36 as compared to the QWB-SA; however, this comparison may be unfair to the extent that the dimensions of health reviewed for content validity in this study were outlined by the author of the SF-36.

The second attribute of content validity relates to representation of both negative and positive aspects of health, since health is more than the mere absence of disease. Both the QWB-SA and SF-36 are worded more to focus on limitations in health status, yet here again the SF-36 may bestow a small advantage, in that it alone assesses some positive states of mental health. Assessing positive aspects of HRQOL can help overcome the tendency that many psychological measures have to pathologize behavior and symptoms and may help practitioners take a more holistic view of patients by recognizing not only deficits, but also their strengths.

A second aim of this study was to evaluate whether the convergent validity as established between these two measures in different populations also extends to this stressed, but healthy, caregiving population. Previous studies found moderate to high correlations between these two measures with the strongest correlations between the QWB score and SF-36 *physical functioning*, with Pearson's  $r$  ranging from 0.51 - 0.69 (Kaplan et al. 1998). Interestingly, in our own sample, correlations were lower ( $r = 0.24 - 0.39$ ) and the QWB-SA score correlated with all subscales of the SF-36 except *physical functioning*. The QWB correlated with the MCS, but not the PCS, and the correlation with the *role-emotional* scale was unexpectedly high compared to

past studies. Our findings conflict with those reported previously and may be related to our specific population of healthy informal caregiving partners. Perhaps these partners under-reported or minimized their own physical symptoms as they observed the physical symptoms of chemotherapy. If this is the case, husbands should be encouraged to openly report their physical symptoms as they relate to their own, typical well-being as opposed to making comparisons to their ill spouse. Alternatively, these partners may have heightened, or be more in tune with, psychological distress and find their emotional symptoms interfere more with HRQOL than physical symptoms. This interpretation would suggest that greater support is needed to assess and treat emotional distress of partners.

Our correlational findings suggest mild to moderate conceptual overlap between the two measures, suggesting that each instrument assesses unique HRQOL areas. Our findings suggest differences among the measures that may be important to consider when evaluating the best measure for use in practice or research. When distinctions between physical and mental health limitations are desired, the user may prefer the SF-36; on the other hand, clinicians who are typically interested in symptom experience as a whole, may prefer the QWB-SA.

In order to further evaluate each measure, we correlated them with psychosocial variables found frequently to correlate with HRQOL. In these correlations, both the QWB-SA and the MCS of the SF-36 correlated to varying degrees with psychosocial constructs, while PCS did not. Correlations were not computed between the subscales of the QWB-SA (symptoms, physical activity, usual activity and mobility) and psychosocial measures due to floor effects. In terms of interpreting these findings, the split of the SF-36 into two components appears to tell a more nuanced story than the QWB-SA score, with the SF-36 MCS and PCS revealing how limitations in emotional, rather than physical domains, more strongly impacts psychosocial function of

partners during the breast cancer treatment. This distinction is lost if relying primarily on the QWB-SA score, which groups mental and physical symptoms together into one score. Because the physical and mental domains of HRQOL relate differently to psychosocial function of these partners, health care providers may want to select an HRQOL measure that clearly distinguishes physical and mental domains of HRQOL in order make more specific and appropriate recommendations on how to improve psychosocial function for partners.

Deciding which HRQOL measure to use in a caregiving population depends on a variety of factors, including the question of interest and the setting (clinical vs. research). The SF-36 provides a profile of functioning on eight dimensions. As much as this is an advantage of the measure, as it can provide information on a variety of areas of functioning, it is also a disadvantage in research studies where eight subscales use up valuable degrees of freedom in the analysis. In those cases, the two factor solution for the SF-36, PCS and MCS may be preferable. The QWB-SA, on the other hand, provides a single numerical value of functioning, an advantage in terms of being able to quantify HRQOL with just one number; however, it presents a disadvantage in terms of disentangling physical from emotional symptoms. Therefore, as a research tool, the QWB-SA may be optimal to include in behavioral science research requiring a common measurement unit, such as cost-effectiveness studies. On the other hand, when more detail about specific aspects of HRQOL are needed, such as in clinical settings or for interventions that target specific areas of functioning, the SF-36 with its various profiles and the ability to group physical and mental health QOL may be ideal, as it allows for an in depth understanding of the impacted components of HRQOL.

The present study provides specific information about the utility of these two HRQOL measures for a new population, informal caregivers of cancer patients in treatment. Although our



sample was a small convenience sample, which limits both the power of our statistical analyses and external validity, it provides important distinctions between instruments and when each might be most useful. In terms of external validity, it is not clear whether these findings would generalize to a broader population of caregivers, such as those who care for Alzheimer's patients, a long-term commitment with a much greater involvement on the part of the caregiver. It is also not clear whether these findings would generalize to partners with different demographic characteristics, as our sample was rather homogenous, mostly Caucasian, educated, and high income, a common problem in research. Finally, although it was a strength of the study that it focused on male caregivers, a group seldom studied, we cannot generalize to a female caregiving population.

In spite of these limitations, the present study provides valuable information regarding the utility of two commonly used instruments and may be helpful to researchers and practitioners who are seeking guidance for selection of HRQOL instruments. Our findings suggest that the choice of HRQOL measures is not a light one. These two instruments are commonly used and both identified as HRQOL measures, yet differ in terms of constructs, measurement characteristics, and correlates.

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### **Compliance with Ethical Standards**

The authors have no conflicts to disclose. This study conforms to ethical standards and was IRB approved to ensure proper treatment of human participants. All participants provided informed consent to participate in this study.

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**Table 1.** Descriptive statistics of administered scales

<i>Scale</i>	<i>M (SD)</i>	<i>Range</i>	<i>Possible Range</i>	<i>Interpretation</i>
<b>QWB Scales</b>				
QWB Score	0.66 (0.13)	0.18 – 0.93	0 – 1	↑ = better QOL
Symptoms	0.32 (0.11)	0.07 – 0.56		↑ = more disruption
Physical Activity	0.05 (0.05)	0.00 - 0.16		
Usual Activity	0.01 (0.02)	0.00 – 0.10		
Mobility	0.00 (0.00)	0.00 – 0.00		
<b>SF-36 Scales</b>			0 – 100	↑ = better QOL
Physical Functioning	53.31 (6.95)	21 – 57		
Role-Physical	51.09 (8.88)	28 - 56		
Bodily Pain	53.01 (8.57)	29 – 63		
General Health	51.85 (8.77)	30 – 64		
Vitality	48.47 (9.95)	23 – 66		
Social Functioning	52.11 (7.81)	25 – 57		
Role-Emotional	47.93 (11.35)	24 – 55		
Mental Health	48.48 (9.69)	19 – 62		
PCS	53.88 (8.51)	21 - 70		
MCS	47.35 (10.28)	19 - 59		
POMS Distress	14.68 (20.28)	-16 - 104		↑ = > mood disturbance
Illness Impact Form	8.54 (4.77)	0 -20	0 – 38	↑ = > assistance
ISEL Social Support	33.85 (6.04)	12 – 40	0 – 40	
Subjective Stress Scale	8.86 (2.67)	4 – 15	0 – 16	↑ = > stress
CES-D Depression	11.39 (8.96)	0 - 38	0 – 60	↑ = > depression
Satisfaction w/ Life	23.04 (6.85)	6 - 35	0 – 35	↑ = > satisfaction

**Table 2.** Content validity comparison

	<b><i>QWB</i></b>	<b><i>SF-36</i></b>
<b>Number of Questions</b>	77	36
<b>Timeframe</b>	3 days	4 weeks
<b>Subscales</b>	Acute and Chronic Symptoms (CPX), Self-Care and Mobility (MOB), Physical Activity (PAC), Self-Care and Usual Activity (SAC)	Physical Functioning (PF), Role-Physical (RP), Bodily Pain (BP), General Health (GH), Vitality (VT), Social Functioning (SF), Role-Emotional (RE), Mental Health (MH)
<b>Ware's Health Concepts</b>		
<b><i>Physical Health: physical limitations, physical abilities, days in bed, physical well-being</i></b>	<p>35 physical symptoms are included in the CPX scale</p> <ul style="list-style-type: none"> <li>- Some symptoms rated on <i>yes/no</i> scale</li> <li>- Some symptoms rated on how many days experienced</li> <li>- Use of health aids (glasses, dentures, etc.) rated on <i>yes/no</i> scale</li> </ul> <p>MOB scale contains 3 items assessing transportation and 1 item assessing overnight stay in care facility</p> <p>PAC scale has 8 items to assess physical limitations in mobility and task performance</p>	<p>10 items on PF scale to assess limitations in physical activities and ADLs rated on 3-point scale (<i>not at all limited to limited a lot</i>)</p> <p>VT scale contains 4 items to assess energy level ranging on 6-point scale (<i>none of the time to all of the time</i>)</p>
<b><i>Role Functioning: limitations in usual role activities due to health (work, school, housework)</i></b>	SAC scale has 1 item to assess how many days physical or emotional reasons interfered with performing usual activities such as work, school or housekeeping	<p>4 items on RP scale assessing problems with work or other activities as consequence of physical health rated as <i>yes/no</i></p> <p>3 items on RE scale to assess problems with work or other activities due to emotional problems rated as <i>yes/no</i></p>
<b><i>Social Functioning: interpersonal contacts and social resources</i></b>	<p>SAC scale has 2 relevant items.</p> <ul style="list-style-type: none"> <li>- How many days physical or emotional reasons interfered with social activities such as visiting family/friends, recreation, and religious activities</li> </ul>	SF scale has 2 items to assess extent to which physical or emotional health interfered with social activities with family, friends, neighbors or groups on 5-point scale ( <i>not at all to extremely</i> ) and amount of time rated on 5-point

	- On which days did you change your activities because of health?	scale ( <i>none of the time</i> to <i>all of the time</i> ) problems interfered with social activities
<b><i>Mental Health: anxiety &amp; depression, psychological well-being, behavioral &amp; emotional control</i></b>	14 specific feelings, thoughts and behaviors related to mental health (depression, anxiety, eating disorder, psychotic thought, sleep) are included in the CPX scale.	MH scale assesses how frequently respondent feels nervous, down, or happy with 5 items rated on 6-point scale ranging from <i>none of the time</i> to <i>all of the time</i>
<b><i>General Health Perceptions: ratings of current health, expectations regarding future health, pain ratings and limitations due to pain</i></b>	<p>CPX scale contains multiple items assessing pain in various body parts (headache, chest, joints, etc.)</p> <p>Assessed in separate section that does not contribute to the QWB overall score or subscale scores</p> <ul style="list-style-type: none"> <li>- Categorize health status (5-point scale ranging from <i>excellent</i> to <i>poor</i>)</li> <li>- Compare health status to 1 year prior</li> <li>- Assess health during past 3 days from 0 – 100</li> </ul>	<p>2 pain items on BP scale</p> <ul style="list-style-type: none"> <li>- How much pain assessed on 6-point scale (<i>none</i> – <i>very severe</i>)</li> <li>- Interference caused by pain on 5-point scale (<i>not at all</i> to <i>extremely</i>)</li> </ul> <p>GH scale</p> <ul style="list-style-type: none"> <li>- Categorize health status (5-point scale ranging from <i>excellent</i> to <i>poor</i>)</li> <li>- Rate level of agreement with statements comparing participant health to others, expectations of future health and feeling excellent</li> </ul>



**Table 3.** Correlations between QWB-SA and SF-36 scores

	<i>QWB-SA Scores</i>			
	QWB Total score	Symptoms	Physical Activity	Usual Activity
<i>N</i> = 79				
SF-36 Scores				
Physical Function	.17	-.13	-.32**	.04
Role Physical	.32**	-.29**	-.30**	-.05
Bodily Pain	.28*	-.22	-.39**	-.10
General Health	.31**	-.31**	-.26*	-.05
Vitality	.23*	-.23*	-.07	-.16
Social Function	.32**	-.30**	-.24*	-.15
Role Emotional	.36**	-.35**	-.15	-.26*
Mental Health	.29**	-.28*	-.13	-.22
PCS	.19	-.15	-.34**	.10
MCS	.33**	-.33**	-.08	-.29*

Note: \* indicates statistical significance,  $p < .05$ ; \*\* indicates statistical significance,  $p < .01$ .

**Table 4.** Correlations between HRQOL and psychosocial variables

<i>N = 79</i>	<i>Mood</i>	<i>Stress</i>	<i>Depression</i>	<i>Satisfaction with Life</i>	<i>Burden</i>	<i>Social Support</i>
QWB <sup>a</sup>	-.37**	-.22	-.45**	.22*	-.29*	.32**
PCS <sup>b</sup>	-.17	-.19	-.19	.18	.02	.01
MCS <sup>c</sup>	-.66**	-.47**	-.73*	.42**	-.37**	.24*

Note: <sup>a</sup>. QWB = Quality of Well-Being Scale score; <sup>b</sup>. PCS = Physical Health Component Summary score; <sup>c</sup>. MCS = Mental Health Component Summary score; \* indicates statistical significance,  $p < .05$ ; \*\* indicates statistical significance,  $p < .01$ .